

Sec 3

محمد عبد الله الغفار → لام

Q: For $X(z) = \frac{z}{z^2 + 4}$, find $x(n)$

$$X(z) = \frac{z}{4\left(\frac{z^2}{4} + 1\right)}$$

$$= \frac{1}{2} \frac{z/2}{\left(\left(\frac{z}{2}\right)^2 + 1\right)} \quad \text{Compare with } \frac{z \sin \omega}{z^2 - 2z \cos \omega + 1}$$

$$* 2z \cos \omega = 0 \Rightarrow \omega = 90^\circ = \frac{\pi}{2}$$

$$\Rightarrow \sin \frac{\pi}{2} = 1$$

$$\therefore z^{-1} \left[\frac{1}{2} \frac{z/2}{\left(\left(\frac{z}{2}\right)^2 + 1\right)} \right] = \frac{1}{2} (2)^n \sin \frac{\pi n}{2}$$

Turn Over \Rightarrow